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SOCRATES AND ENTHUSIASM FOR STRAW

On Ecology and a Dubious Ethos of Technological Determinism

PROLOGUE

John Reinforced-Concrete, *M.Eng., M.Arch.*, lover of black turtlenecks and global architecture, was reading *Our Common Future*, the famous Brundtland report of 1987¹, which introduced the concept of sustainable development. He was looking for a quotation to describe his project when he found one... He did not know, however, that more and more ghosts were congregating in his study...

'Well, well, well, at least there's a precise definition here,' J. Reinforced-Concrete read under his breath. '»In the current state of civilisation, sustainable development is possible, it is the kind of development where the needs of the present generation can be satisfied without decreasing the chances of the future generations to satisfy theirs, too»'.

'...But what does it actually mean?' asked a toga-clad ghost of Socrates who was leaning against the drawing board.

'To me, it's clear,' replied Straw Mulchman², turning up on the window sill. 'It's about two kinds of fairness: one, between regions in the world, and the other, between generations. All later interpretations of the report are tons of cosmetics which dilute this one word: »fairness«. Let me add, for the sake of clarity, that to me the conditions of sustainability are fulfilled only by low-tech buildings made of natural materials: straw, such as this,' he said, taking out some straw from his shoes, 'and clay, wood, possibly also recycled materials'.

And, as if to confirm his words, Straw Mulchman showed a few pictures.

² The reader may wonder who Straw Mulchman is. It is a personification of a straw mulch, which, in folklore, should not be offended for fear it may play tricks on the offender. It may also represent inability to act (trans. note).

¹ World Commission on Environment and Development, *Our Common Future*, Oxford: Oxford University Press, 1987.



PHOTO: M. SIPLANE



PHOTO: M. SIPLANE



PHOTO: HTTP://WWW.S-HOUSE.AT/

Architects are so used to meeting ghosts that, hardly surprised, J. R.-I., *M.Eng.* made coffee and served it to his guests. This is how that literary evening began.

ACT 1: ON ECO-DEVELOPMENT AND SURPLUS WORDS

J. REINFORCED-CONCRETE: Whoa! If the term comprises 'development', it is, I suppose, about developing, and not going back to clay and straw. I like technology and I'd like to see

Above: Salto Architects, Straw Theatre – temporary headquarters of the NO99 theatre ensemble, Tallinn, Estonia, 2010-2011

Below: Robert Wimmer (Gruppe Angepasste Technologie, Technische Universität Wien), S-House – house of straw and wood, Böhleimkirchen, Austria, 2005

sustainable development as a new impulse for ecology to go hand in hand with technological development. I suppose it must be feasible.

STRAW MULCHMAN: And here's the rub... The term 'sustainable development', or equally unfortunate 'sustainability', is the weakest point in the whole definition. I preferred the original Polish translation 'eco-development' which was still widely used back in the 1990s. It had at least something to do with ecology. Since it was changed into 'sustainable development', all sorts of platitudes emerged. 'Sustainability' has been even more ambiguous from the start. Experts in this field, such as Layard and Davoudi, claim that there can be 'strong' sustainable development, which encompasses both the need to restrict and to maintain ethical standards, and 'weak' sustainable development, which is satisfied with just a few changes within the present system³. To me, the difference consists in the different meanings of 'fairness', and bending the definition. I've seen so many companies eagerly adorn their reports with this term, claiming that for the sake of 'sustainability' their company had to outsource to Malaysian companies which were not restricted by employment standards and ecology. What do you say to that, Socrates? Why are you silent? What do you think of our reading today?

SOCRATES: First of all, friends, there's quite a lot of text in this text. Anyway, it's the same with most writing on ecology: there are many letters here. Over the past quarter-century reprints have got stuck in reprints of an even greater number of letters and writings, and something important has got lost in the process.

³ Straw Mulchman is referring to the distinction between 'weak' and 'strong' sustainable development discussed e.g. in: Antonina Layard, Davoudi Simin, Sustainable Development and Planning: An Overview [in:] Antonina Layard, Davoudi Simin, Batty Susan (eds.), Planning for Sustainable Future, London: Spoon Press, 2001.

J. REINFORCED-CONCRETE: Socrates, please, don't tell me you're against writing as such! You can't be that backward! You can't rationally undermine written word.

SOCRATES: Yes, you can!

J. REINFORCED-CONCRETE: But it's not just negating technology; it's undermining civilisation.

SOCRATES: Let me tell you a story I once told my pupils, which my pupil Plato wrote down in his little book *Phaedrus*. To me, this story is not only about writing but also of many new inventions, on technology, and ecology, as well... Here goes: 'At the Egyptian city of Naucratis, there was a famous old god, whose name was Theuth [...] and he was the inventor of many arts, such as arithmetic and calculation and geometry and astronomy and draughts and dice, but his great discovery was the use of letters. Now in those days the god Thamus was the king of the whole country of Egypt [...]. To him came Theuth and showed his inventions, desiring that the other Egyptians might be allowed to have the benefit of them; he enumerated them, and Thamus enquired about their several uses, and praised some of them and censured others, as he approved or disapproved of them. [...] But when they came to letters, This, said Theuth, will make the Egyptians wiser and give them better memories; it is a specific both for the memory and for the wit. Thamus replied: O most ingenious Theuth, the parent or inventor of an art is not always the best judge of the utility or inutility of his own inventions to the users of them. And in this instance, you who are the father of letters, from a paternal love of your own children have been led to attribute to them a quality which they cannot have; for this discovery of yours will create forgetfulness in the learners' souls, because they will not use their memories; they will trust to the external written charac-

ters and not remember of themselves. The specific which you have discovered is an aid not to memory, but to reminiscence, and you give your disciples not truth, but only the semblance of truth; they will be hearers of many things and will have learned nothing; they will appear to be omniscient and will generally know nothing; they will be tiresome company, having the show of wisdom without the reality'⁴.

J. REINFORCED-CONCRETE: Do you mean I'm a wiseacre because I like technology and prefer clear, precise statements to ambiguous speculations about fairness and ecology, which each of us defines differently? What do we need this verbal candy floss for?

STRAW MULCHMAN: But what do you mean, we don't know what it is? The concept of ecology was coined in 1866 by Ernst Haeckel in *Generelle Morphologie der Organismen*, where he described it as a science focusing on relations between organisms and their surroundings... Speaking of relations, Straw Mulchman continued, today, to translate it into the language of architecture, we'd speak of a context, contacts, attitude to other people, to nature... of relationships: in other words, of problems which people commonly call love. Let's not be afraid of this word – love – because it has a lot to do with ecology... Perhaps everything!

ACT 2: ON DELUSIVE NUMBERS AND DIAGRAMS

J. REINFORCED-CONCRETE: Love?! Fairness?! Either you are in a mood for teasing, or you've lost your mind. How can you give any sensible tips for architects based on such romantic esoterica?

⁴ This and other themes of the discussion between Socrates and Phaedrus can be found in Plato, *Phaedrus*, trans. Benjamin Jowett, <http://classics.mit.edu/Plato/phaedrus.html> (access: 15.10. 2013).

SOCRATES: Do you think that if something cannot be measured, it's not worth considering? I think otherwise. There are too many people around who know the price of everything, but know the value of nothing. In his laboratory, Albert Einstein had an inscription, 'Not everything that can be counted, counts. Not everything that counts can be counted'.

J. REINFORCED-CONCRETE: But Einstein also said: $E=mc^2$, and that was very precise. Energy is a sensible starting point for conversation, especially a conversation on sustainable development.

SOCRATES: All right then, let's talk about energy in architecture. How important is it, from your point of view, for sustainable development?

J. REINFORCED-CONCRETE: It's elementary! Fundamental! You can measure energy consumption, and calculate it into fuel, and through it - into environmental pollution and carbon footprint, etc. In architecture, if we want to walk about ecology in a sensible way, we must talk of 'inbuilt energy', the energy we have to use in the process of manufacturing materials, their shipment and building. In this way, we'll obtain precise data. We'll be able to compare and determine that we need about 88 MJ to manufacture 1 kilogram of Styrofoam, 35 MJ to produce 1 kilogram of steel, 10 MJ for a kilogram of wood, 3 MJ for a brick, 0.9 MJ for straw and only 1.1 MJ for concrete.

SOCRATES: Excellent! You're speaking wisely. Interestingly, this data implies that steel is a dreadful pollutant, not good at all, while concrete (like straw) is fairly harmless. I've often seen this data, especially at presentations made by concrete-manufacturing companies. Can I ask you also to complete the table with a column showing the weight of materials...

Don't you think that featuring materials MJ/kg and leaving out the weight of a product is actually deceitful? After all, concrete is 24 times heavier than straw so there is actually much less of it at the same weight. What's more, each of these materials has a different function and listing them together may be misleading. What value are these figures then?

J. REINFORCED-CONCRETE: And yet a light concrete block has a relatively mild impact on CO₂ pollution.

SOCRATES: Yes, I recognise this argument from concrete ads! But it's deceptive when speakers first eagerly discuss the properties of a light concrete block, which indeed contains less cement, and then imperceptibly stretch the ad and all its claims onto all types of concrete, focusing on modern elegance of these materials. Owing to such presentation of data, you can form an impression that concrete is one of the most ecologically friendly materials, while, as you know, it's not. Manufacturing one ton of cement produces one ton of CO₂, and the cement industry is one of the major pollutants on our planet, responsible as it is for 5 to 8 % of all man-made pollution. If we really care for the environment, shouldn't we start introducing changes right there, by restricting the use of this product?

STRAW MULCHMAN: And besides... speaking of well-being... would you be happy living next to a cement factory...how much of that happiness would there be per one m²?

SOCRATES: At any rate, tables are too colourful, too straight-forward and absorbing, and also very deceptive... To have a big picture, you need to take more factors into account and ask, is this material recyclable? How easily (we know that it is easy to recast steel, while it is considerably more difficult in the

case of reinforced concrete)? Is it easy to build with it and repair it on your own? Is the material biodegradable? How much rubbish shall we leave to future generations (buildings made of natural materials will give the future generations the opportunity to build their own architecture from scratch)? As to energy and figures, perhaps it might be more reasonable to compare materials in a more holistic way and in a proper context, for instance: how much energy is necessary to make whole walls of the same thermoinsulating power (e.g. $U=0,11\text{W/m}^2\text{K}$)? Here, straw walls are 16 times superior to Styrofoam-insulated concrete walls. Just think about it: not 2, not 4, not 8, but 16 times superior.

J. REINFORCED-CONCRETE: Don't throw the baby out with the bathwater. Calculating energy is vital to understand how harmful materials can be. Another important concept in this field is for example 'exploitation energy', that is the energy used in the building for heating, ventilation, cooling, air conditioning and work of various appliances. We can arrive at major conclusions by comparing inbuilt energy with exploitation energy. It turns out that inbuilt energy is three times smaller than exploitation energy... the conclusions are fundamental: to protect the environment effectively, we have to invest in technological solutions which, when used in buildings, will prove energy-saving. It follows, too, that it is much less important if buildings are built with any particular materials. The whole fuss about natural materials that Straw Mulchman's making is actually hassle over trifles.

SOCRATES: I can see you're numerate. I recognise the numbers and diagrams you're referring to from presentations by companies which speak of ventilation and heating, willing to sell their products. Are you aware, though, that the data you're quoting refers

mainly to poorly insulated office blocks of the 1980s and .90s? Also, a well-insulated building, such as a straw house, with well-designed thermal mass, will not need heating at all. Secondly, a lot has changed since the .80s. As long as buildings comply with norms and are well-designed, in 10 years' time their operating energy will amount to only 5%. It means that inbuilt energy has to be an important consideration in discussions on energy-efficiency. Straw Mulchman is a slightly crazy zealot but I wouldn't reject his arguments.

ACT 3: ON DIFFERENT KINDS OF QUESTIONS AND WHO LIKES TECHNOLOGY

STRAW MULCHMAN: But why don't we try to measure happiness per m²? I see that technological thinking is taking us nowhere.

J. REINFORCED-CONCRETE: Why taking us nowhere? Why aren't we talking of so many new, sometimes brilliant solutions: solar batteries, biomass stoves, heat and grey-water recovery systems, of ventilation, heat pumps, electricity-generating photovoltaic cells, or of new solutions in passive houses? It's so fascinating!

SOCRATES: Of course, it is! Of course there are some fascinating, good solutions and inventions! It's a subject for our next meetings. But I believe that before we start discussing each of those inventions, there must be room for reflection and questions. Who invents these appliances? What for? How much happiness do they give to us, and how much to the environment? What kinds of happiness, anyway? When should we use them? And, more importantly, when is it not advisable to use them? I am not against good inventions but let me be skeptical. For thousands, millions of years ecosystems evolved supporting life on earth. For thousands of years people lived in a sustainable way; there was no need to invent terms for it. They didn't

steal resources from the next generations. Since the industrial revolution everything has changed, we've been euphoric over new inventions from the steam engine to Facebook... They have always been enthusiastically welcomed but not always that beneficial – remember asbestos or housing estates made up of apartment blocks? Over just one hundred years advances in technology and inventions have changed the world which had been sustainable for millions of years. Some people's lives are incomparably easier but at what cost to other people and the environment? We are too strong and too irresponsible, too unfair to the next generations and to nature. Mass extinction of species has been called the sixth disaster. It is estimated that from 27,000 to 40,000 animal and plant species become extinct annually as a result of human inventions! Ever since the 1990s it has been suspected that the use of inventions such as pesticides has contributed to the mass extinction of bees. It means that by 2000 their population had diminished in some regions, including Europe, by 90 %. Our native bumblebees have become an endangered species! Einstein, who you refer to, said that if the bee disappeared from earth, the human species would have four years left. Unpredictable climate changes may make come true the bleak scenario of an ecological disaster, mass human migrations, and fossil fuel and water wars. Let's hope it won't happen... but it is viable. The only ones to doubt it are a group of environmental skeptics who, it has recently been revealed, have received a total of 118 million dollars from oil companies to undermine ecological reports. Do we want to be as cheerful and easygoing as they are? Doesn't this situation call for reflection and a few questions, before we start to praise each new invention?

J. REINFORCED-CONCRETE: All right, all right. If you approach it so philosophically, let me quote Robert Pirsig, a famous philosopher of

technology, who said that if Buddha was everywhere, he must be present in machines, too, and that it was not possible for the technical part of the world to exist separately from the humanistic side. I am fascinated by technology so I like to put it in my buildings and I know my clients like it, too.

STRAW MULCHMAN: No, you don't! All you like is buying technology, and not developing it – that makes a tremendous difference! You don't like repairing it and you're not that interested to know how something is constructed, how it works and whether it's recyclable. Your designs are based on ready-made products from catalogues. Instead of being a designer, you've become a sales representative of gadgets. A client whose only ethics is to know what's trendy. You are a necessary cog in the machine of a system which mainly wants to possess. But you know what? If you don't know what something is made of and how to repair it, then you actually don't possess it. Look at advertisements for sustainable design... they're just product catalogues.

J. REINFORCED-CONCRETE: It's easy to throw insults. At least I'm not nihilistically taking technology back to when Queen Anne was alive, like those who build of straw, who have turned their hatred of technology into their banner!

STRAW MULCHMAN: Quite the opposite – they do like technology. They keep on developing it, experimenting to come up with more user-friendly solutions that will also be friendly to nature and to future generations. Please, go to a construction site where natural materials are used, and you'll hear discussions on technology and technological solutions and their impact on the environment and people. Those involved in such building will not only ask 'how to do something?' but also 'why do it?' or even 'is it possible not to do it?' – the latter is also a thoroughly

technological question. If you go to a high-tech construction site, you'll mainly hear conversations on how to finish building the fastest and cheapest way possible. What does it mean?...

J. REINFORCED-CONCRETE: Listen, Straw Mulchman, you don't even have architecture qualifications. You don't understand the situation at a construction site. Of course we are concerned about the deadlines and costs, but we also care about beauty and quality... and technology is a part of it. Those primitive buildings made of straw and clay you're so much in favour of are backward – it's a trap contemporary architecture should avoid.

STRAW MULCHMAN: It's sad and surprising how little you know of natural architecture. You've been taken in by those who want to discredit it because it's against their interests. It's sheer calculation on their part, while you are just ignorant. I wish you could see how varied natural buildings can be. They can be both simple, classical, and modern.

ACT 4: ON TECHNOLOGICAL DETERMINISM, THE MAFIA, POLITICS AND DANGEROUS REGULATIONS

J. REINFORCED-CONCRETE: Why do you have it in for technology? It's everything we do. You can't evaluate it in terms of good and evil. Technology is beyond morality. The only negative thing is a lack of technology development. Every region in the world would like to catch up with those that are more technologically developed. Everyone prefers to have well-working appliances rather than faulty ones. Technology development goes side by side with economic growth and is advocated by all political parties from left to right. Owing to the development of technology, we can solve the major problems of today's world, such as crises, inflation or unemployment.

STRAW MULCHMAN (sarcastically): Oh yes! But it makes me afraid when I think of those politicians who have actually been successful in curbing inflation, unemployment, crises or overpopulation... Remember them?... Stalin, Hitler, Pol Pot.

SOCRATES: Straw Mulchman, it was a cheap shot. J. Reinforced-Concrete is not a fascist. He believes that technology in itself is neither good nor bad. However, if it were the case, what point would there be discussing all those relationships between technology and ecology? Sustainable development involves thoroughly ethical considerations.

J. REINFORCED-CONCRETE: I mean that fighting technology development is tilting at windmills.

SOCRATES: I'm afraid we're touching upon the problem of technological determinism, which claims that technology must develop, and that the process is unstoppable. If you come to think about it, it's quite dejecting and sad if we assume that technology doesn't depend on us... that we can do nothing... that all we can do is beautify that corpse which is dead technology (because it's not alive, after all). I'd like to believe that there is an alternative.

J. REINFORCED-CONCRETE: I'm afraid you're the only one to think that way, Socrates...

SOCRATES: I don't think so. Ever since Thomas Kuhn wrote the groundbreaking *Structure of Scientific Revolutions* back in the 1960s⁵, an interesting science called STS (Science, Technology and Society) has been developing. It has become an acknowledged field of study which analyses the influence of society on the devel-

opment of science and technology. It is notable that there is an STS book *The Social Construction of Technology System* at a small exhibition presenting the most groundbreaking scientific works at the famous MIT. It shows the illusory nature of technological determinism through evolution of various inventions, including bicycles and plastics. The authors claim that technology may equally well develop or not in various directions, and the decisive factor is public awareness and aspirations, as well as relationships within the groups that are part of it. And although I know that Straw Mulchman was being obtrusive today and you don't feel like listening to him anymore, you must admit that the natural technologies he advocates may exemplify an alternative direction of architecture development. Look, reinforced concrete and plastics were developed in the 20th century; they were extensively researched in a favorable cultural, political and economic climate, so apart from the rational reasons of their success, there were many additional ones, which became trendy and were associated with modernity, so they were subsidised by the state. Legislature, which strived to fully codify building law, enhanced the role of this material. Since it was required in many parts of the building, such as the foundations or lintels, etc., there was no alternative. And yet for thousands of years houses, castles and palaces had been built without reinforced concrete. The construction industry was struck by a sudden amnesia. At the same time, natural building of clay or wood, not to say straw, was not developed. At the end of the 20th century there were precious few examples of successful natural architecture... and even fewer examples that might inspire architects and potential clients. Towards the end of the century you might draw a conclusion that since clay, wood and straw were old technologies that had given way to concrete and plastic, the old ones were inferior, while the new ones were

⁵ Thomas Kuhn, *The Structure of Scientific Revolutions*, Chicago: University of Chicago Press, 1962.

superior. Many still think the way you do, Mr Reinforced-Concrete. One might even propose an analogy to Darwin's theory. The changes that have taken place over the last decade show that technology development is neither so linear nor so obvious. The concept of the ethical consumer emerged in the society, denoting one who seeks products manufactured following ethical standards. The greatest European fair, Ecobuild, in London presented tens, if not hundreds, of natural materials, with wood being the most popular. Almost one hundred years of neglect in the development of natural materials is slowly being made up for. Wood, which had been thrown on a scrap heap a few years ago, is now a showcase of trendy architects. What I want to say is that there are many factors contributing to the development of technology, which can only be understood from a humanist perspective.

J. REINFORCED-CONCRETE: ... But should anyone support the use of concrete if it's as bad as you claim?... it's some kind of conspiracy theory.

STRAW MULCHMAN: Oh, there may be reasons galore! And you don't need to look far for fodder for conspiracy theories. Have you heard of a New York mafia called 'The Concrete Club', which took over all contracts related to cement and concrete, if their value exceeded 2 million dollars, like the New York designs by Ieoh Ming Pei? Those mafiosos are still doing time in prison but the concrete industry tends to monopolise and set up big corporations. The housing industry could be very different now. Natural building materials, including clay, straw blocks, wood or stone, are usually available locally, and by nature their production is decentralized.

J. REINFORCED-CONCRETE: But nobody forbids anybody to build of clay or straw.

STRAW MULCHMAN: Unfortunately, nobody helps, either, and soon it may be effectively hindered. That's the main problem and the reason why I'm so angry. Although there are hundreds of examples in the world that using these technologies we can build more than just hobbit holes, for example imposing public buildings, soon we may have to face the situation that it will become illegal in Poland. There are loud calls to introduce a law to make it obligatory to certify all building materials. As a result, clay and straw which have been used for centuries, and which, as we've said, need support and development, will become illegal. It is unrealistic to expect straw blocks or clay from every pit to be certified. Who does it benefit, do you think? Do you still think I'm talking about conspiracy theories?

EPILOGUE: WHAT E=MC² MEANS

SOCRATES: What worries me most in our conversation is the thought of how many people would like to deal with problems of ecology and technology using technological methods only.

STRAW MULCHMAN: I know... Socrates, now you will probably want to quote Martin Heidegger, who wrote in 'The Question Concerning Technology' that the problem of technology is not a technological problem. In this, he hit the mark. The problem of technology is a humanistic problem... J. Reinforced-Concrete is making a lot of fuss over technological development, while what matters is a lack of humanistic development.

J. REINFORCED-CONCRETE: Humanism is too soft and too easily exposable to manipulations by pseudoscientific swindlers. You may be kind but stupid and it's a pity that you don't appreciate my views on science... and energy.

SOCRATES: Not at all! Science is reasonable, and so is knowledge of energy... But first things first... what is energy, actually?

STRAW MULCHMAN: Energy, from the Greek, is a property characterizing the ability to do work.

SOCRATES: That's it! To DO WORK!... We've spoken of inbuilt energy and exploitation energy but we can also speak of potential energy, psychic energy, or vitality. What kind of energy can architecture release in us... What kind of work and activity can it encourage us to do?

STRAW MULCHMAN: If we associate lodging mainly with buying, then it does suck energy out of our pockets. Then $E=mc^2$ would mean $ENERGY = (\text{money}) \times (\text{credit})^2$

SOCRATES: But buildings can give positive energy – encourage you to have fun and be active!

STRAW MULCHMAN: That's what it's all about! That's the magic of low-tech building. Because these techniques are simple and accessible, they encourage you to act. People are craving opportunities to develop their surroundings because most activities have been handed over to machines. And tangible building excites, gives us hope that we can act and that technology depends on us. These natural buildings made of clay, wood and straw have the greatest energy... I think the phrase 'straw enthusiasm'⁷ should be changed into 'enthusiasm for straw'.

Energy can be calculated with the following formula:

Energy = (Potential) x (Man)²

or Energy = (love) x (willingness)²...

What do you say, Mr Reinforced-Concrete?

⁶ http://money.cnn.com/magazines/fortune/fortune_archive/1988/06/06/70628/

⁷ In Polish, the idiom 'straw enthusiasm' means 'flash in the pan' (trans. note).